TABLE I

Initial Poll Results

TABLE II

Educational Background of Respondents

Attachment 3

The course sequence which was chosen was as follows:

I Vectorial Representation of Variables: matrix formats; manipulations; vectorial products; orthogonality; independence; Fourier Series; Laplace representation; convolution; Walsh Functions.

The intent here was to develop a base communications in the course, to set the context of terminology and to introduce the sequence to a group which had indicated strength in the topical area. Applications were treated, homework solutions and several representative journal reprints were distributed through the month, between ensuing sessions.

II Linear System Variables: convolution; Laplace manipulations; applications to linear differential equations; damping considerations; impulse responses; system flow diagram; Z Transforms; sampling; numerical methods: Gauss' elimination, matrix inversion.

The goal here was to backtrack into the previous session, held a month previously and to apply the earlier developed tools to simple linear systems. Some linearization schemes were rationalized; sample applications were treated in class to varying depths, generally on a deterministic basis.

III Probability and Statistics: concepts of discrete and continuous variables; sample space; union; intersection; independence; definitions; density function; distribution function; expectancy operator; moments; confidence limits.

It was hoped here to develop tools for treating probabilistic problems. The attempt was to tie in the discrete abstract variable to several physical situations. Applications were framed to repeat the use of material of the sessions.

IV Stochastic Processes: stationary processes; approximations to Gaussian; filtering and averaging; correlation; convolution; cross-correlation; covariance matrix; power spectral estimates; band limiting effects.

The intent in this session was to relate single continuous variables to the array of tools available to handle generalized data bases. Points of relevance were made to tie in the preceeding sessions to space-time variables found in a number of disciplines. Experimental data was developed in handouts and related to different distributions for signal and noise.

X Servomechanism Subsytems: Linear models; closed loop and open loop response; root locus; Bode and Nyquist citeria; optimal control; common non-linearities; phase-plane appmach.

This was an area shown strong on the initial poll. The intent here was to give a generally deterministic treatment to this common subsystem. Wiener Hopf and Kalman filtering were treated.

XI Modulation Subsystems- Analog: amplitude, phase and frequency modulation models; deterministic vectorial and frequency models, noise consideration in design; sideband considerations; convolutions; demodulationschemes;

The goal was to establish here a base for definitions and for common communications with the class treatmet. A strong indicator had been shown in the poll for this area.

XII Modulation Subsystems-Pulsed: PPM, PCM, PWM, etc. and other pulsedmodels were treated. Relationships between deterministic and band noisu-limited cases; system noise and environmental noise budgets.

Second part of modulation trdatment.

V. Stochastic Processes: general review and excercise of modelling tools presented to date; [illegible]ls and interference; properties of space and time variables in single dimension case; conditional probability.

Feedback at this point showed that the pace of preceeding sessions was too fast. It was attempted to recapitulate cumulative material.

VI Detector Subsystems: one dimensional signal and noise; detection; decision threshold; optimum processing; receiver operating characteristics; interference effects from ambient noise, system noise, doppler, reverberation, channel uncertainty in a variety of applications.

It had been hoped here that a consistent approach on a set of commonality subsystem functions could be made for ensuing sessions. The detection function is the most common across a variety of disciplings with applications examples in biomedicine, radar, communications, acoustics, optics, and in seismics.

VII Detector Subsystems: optimum detection; prewhitening; Markov noise; detectability criteria; coherent processing; energy detection; confidence measures; Students' t Test.

Continued work on detection functions.

VIII Space-Time Processing Subsystems: multisensor arrays; signal and noise matrices; prewhitening; matched filters; detection; averaging schemes.

The linear array and its variations was the central model for two sessions on spatial subsystems. This had been cited as an area requiring emphasis earlier.

IX Spatial Processors: optimal arrays; lobes in time and space; coherency; detectability for several configuarations; near field/far field considerations; non-planar wavefronts.

Intent here was to bring in the cumulative set of modeling tools to a group of spatial applications.